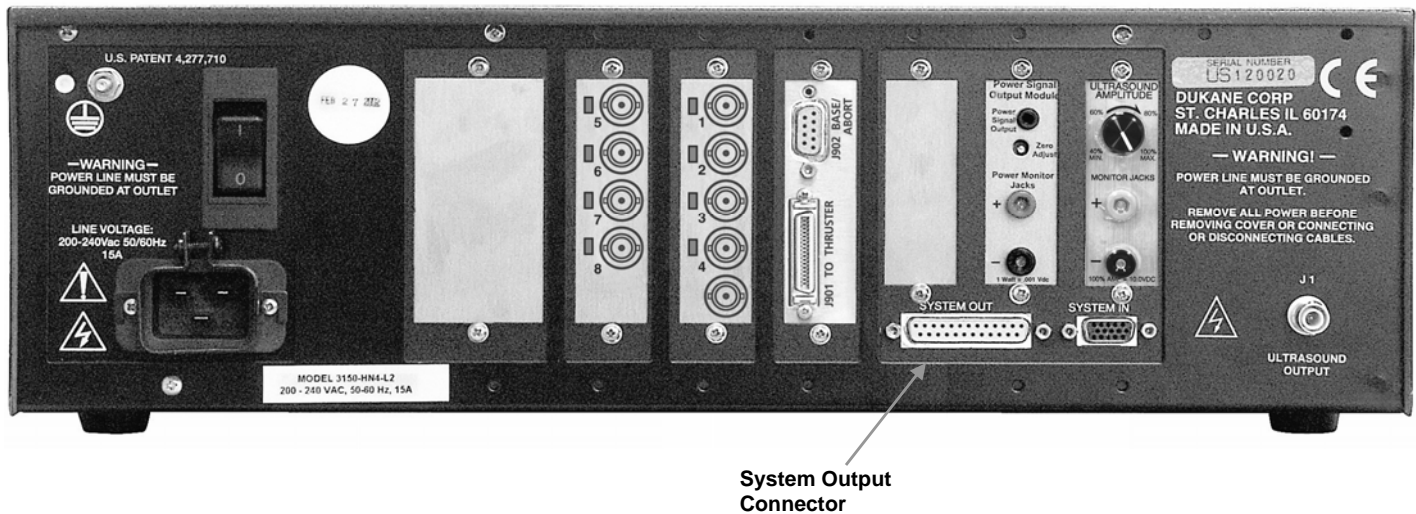


## Automation Interface Requirements for the System Output Interface of a DPC II / II+ Welding System

The DPC II / II+ welding system offers several features that are intended to communicate with automation. These features allow the automation to respond to events that occur during the welding process. This document will provide guidelines that will help you interface automation to a DPC welding system per Dukane Corporation's requirements. Information within this document is intended to supplement the information in the DPC II (Dukane part # 403-558) and DPC II+ (Dukane part # 403-551) Manuals.

### Application Note Topics:

- The System Out Pin assignments
- The 200-1302 L2 Output Cable
- Status Output Signal Descriptions
- Configuration Options for the Status Output Pins
- Status Output Interface Examples



## System Output Connector

The System Output Interface connector is the primary communications link between the DPC II /II+ status output features and the users automation equipment. This connector provides status signals that can be used to monitor DPC weld data analysis results as well as timing issues related to the processing of the weld sequence.

### DPC II / II+ Systems

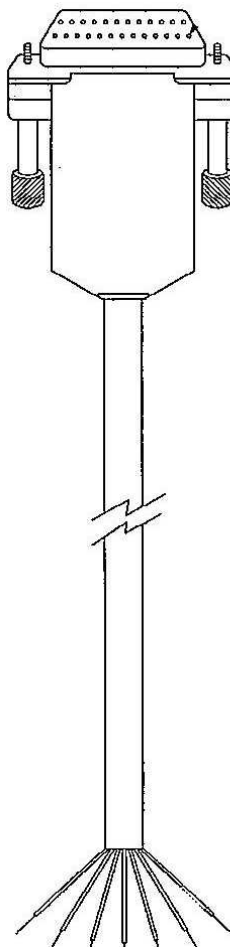
Pin Number	DPC Signal Name	DPC Signal Type
1	Power Supply	+ 22 VDC .25 A max
2	Ground	Power Supply Return
3	Ground	Output Common for pin 4
4	Status Driver	Output
6	Ultrasound Active Status	Output
7	System Fault Status	Output
8	Over Temperature Fault Status	Output
9	Overload Fault Status	Output
10	On Line Status	Output
11	Ground	Output Common for pins 6-10, 12, 18
12	Remote Amplitude Fault Status <sup>1</sup>	Output
13	Ground	Output Common for pins 14-16
14	Frequency Monitor	Output
15	Amplitude Monitor	Output
16	Power Signal Monitor <sup>2</sup>	Output
18	Multi Probe (MPC) Ready Status <sup>3</sup>	Output
19	Power Fail Status	Output

### DPC II+ Only Systems

20	Bad/Suspect Part Status	Output
21	Good Part Status	Output
22	Ready (Cycle Ready) Status	Output
23	In Hold (In Dwell) Status	Output
24	Isolated Output Common	Output Common for pin 19-23

1. Requires an optional Remote Amplitude Control Module.
2. Requires an optional Power Signal Output Module.
3. Requires an optional Multi-Probe Controller Module. (Only compatible with Rev 1 DPC II motherboard)

COLOR CODE OF CABLE	
PIN #	COLOR
1	BLK
2	WHT
3	RED
4	GRN
5	ORN
6	BLU
7	WHT/BLK
8	RED/BLK
9	GRN/BLK
10	ORN/BLK
11	BLU/BLK
12	BLK/WHT
13	RED/WHT
14	GRN/WHT
15	BLU/WHT
16	BLK/RED
17	WHT/RED
18	ORN/RED
19	BLU/RED
20	RED/GRN
21	ORN/GRN
22	BLK/WHT/RED
23	WHT/BLK/RED
24	RED/BLK/WHT
25	GRN/BLK/WHT



Cable Part Numbers	
PART #	LENGTH
200-1302	10 FT
200-1302-15	15 FT
200-1302-20	20 FT
200-1302-25	25 FT
200-1302-30	30 FT
200-1302-33	CUSTOM

### Status Output Signal Descriptions:

- Status Driver - (Pin 4) This status output will activate per the jumper settings described within the configuration information on the following pages. The default jumper settings for this status output will produce a contact closure to the status driver ground on pin 3 when a DPC overload conditions occurs.
- Ultrasound Status- (Pin 6) This status output will produce a contact closure to the status output ground on pin 11 when the DPC I ultrasound signal is active. This output will deactivate when the DPC ultrasound signal deactivates.
- System Fault Status- (Pin 7) This status output will produce a contact closure to the status output ground on pin 11 when the AC voltage or internal DPC power supplies do not comply with the DPC's specified voltage range. A DPC front panel indicator will also activate at this time.
- Over Temperature Status - (Pin 8) This status output will produce a contact closure to the status output ground on pin 11 when the temperature of the DPC exceeds it's maximum temperature rating. A DPC front panel indicator will also activate at this time. This output will deactivate when the DPC returns to a temperature within it's specified operating range.
- Overload Fault Status - (Pin 9) This status output will produce a contact closure to the status output ground on pin 11 when the power level of the process exceeds the maximum power level of the DPC . A DPC front panel indicator will also activate at this time. This output will deactivate when the DPC cycle activation signal is deactivated.
- On Line Status - (Pin 10) This status output will produce a contact closure to the status output ground on pin 11 when the DPC has been set to On Line using the front panel interface of the DPC. The DPC must be configured to an On Line condition before a DPC cycle can be activated.
- Current Loop Fault Status - (Pin 12) This status output will produce a contact closure to the status output ground on pin 11 when the remote amplitude control signal from the customers equipment fails to comply with the specified range of 4mA to 20 mA for that feature. The front panel status display will indicate a fault.
- Frequency Monitor - (Pin 14) This monitor signal produces a 31 V rms sine wave with a frequency equivalent to the DPC ultrasound frequency.
- Amplitude Monitor - (Pin 15) This Monitor signal is proportional to the amplitude setting of the DPC. The scale for this signal is 10.0V = 100% (e.g. a loop current of 10mA yields 6V). Please refer to the DPC manual for further details on the functionality of the remote amplitude control feature.
- Power Monitor - (Pin 16) This Monitor signal is proportional to the true RMS ultrasonic output power being drawn from the DPC. The scale for this signal is 1mV = 1 Watt on the 20kHz, 30kHz, and 40kHz models. The maximum full scale output is 4.095V (4095 Watts). On the 50kHz and 70kHz models, the scale factor is 10mV = 1 Watt with a maximum full scale output of 409.5 Watts.

## Status Output Signal Descriptions (Continued):

- MPC Ready Status - (Pin 18) This Status output will produce a contact closure to the status output ground on pin 11 when the DPC is ready to receive the MPC probe configuration signals. Please refer to the DPC manual for further information on the use of the MPC feature.
- Power Fail Status - (Pin 19) This status output will deactivate when the AC voltage which is powering the DPC does not comply with the values specified for the DPC. Please refer to the DPC manual for AC supply voltage specifications.
- Bad / Suspect Part Status - (Pin 20) This status output will activate when the data acquired during the welding sequence exceeds one of the user defined boundaries within the Process Limits portion of the user setup. Please refer to the Process Limits section of the DPC manual for further details on selecting and setting up a Process Limit window.
- Good Part Status - (Pin 21) This status output will activate when the data acquired during the welding sequence does not exceed any of the user defined boundaries within the Bad Part or Suspect Part Limits portion of the user setup. Please refer to the Process Limits section of the DPC manual for further details on selecting and setting up a Process Limit window.
- Ready (Cycle Ready) Status - (Pin 22) This status output will activate at the completion of the Hold portion of the welding sequence. It should be noted that the activation of the Afterburst feature and the return of the pneumatic press to the home position will occur after the activation of the Ready Output status signal. Please refer to the Process Control section of the DPC manual for further information on the activation and use of the Afterburst feature.
- In Dwell (In Hold) Status - (Pin23) This status output will activate while the DPC is processing the Hold portion of the welding cycle.

## Internal DPC Jumper Block Configuration Options

The DPC II / II+ provides three internal jumpers that allow the user to configure the status output on pin 4 of the system output connector for compatibility with the users equipment. Both configurable jumpers are located on the DPC II / II+ 110-3606 system interface board which is located in bottom of the DPC near the rear panel. The 110-3606 system interface board can be identified as the board connected to the System Input and System Output connector which extend from the back panel of the DPC II / II+ chassis.

**Warning:** The DPC chassis cover should not be removed until the DPC power cord has been removed from the AC voltage supply. After removing the DPC power cord from the AC voltage supply, the DPC requires fifteen minutes to discharge to safe levels. Do not remove the DPC cover until the DPC has discharged to safe levels. Avoid contact with all internal DPC components that are not specified within the jumper configuration procedure below. Failure to comply with these requirements can result in serious personal injury and damage to the DPC welding system.

### STATUS DRIVER NORMAL STATE SELECTION

(associated with pin 4 of the system output connector)

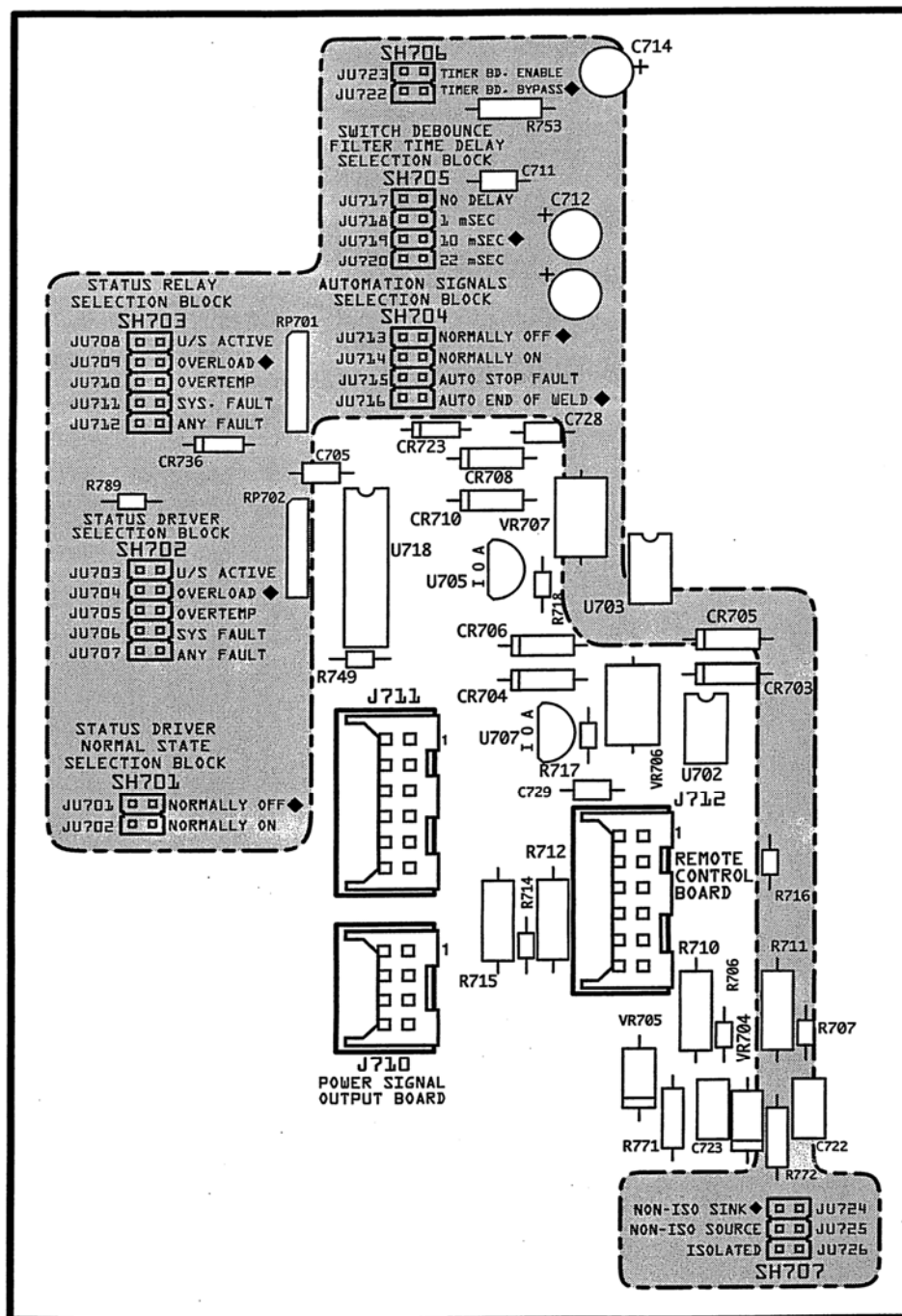
#### Jumper Block – SH701

JU701 – Normally OFF (Factory Default)  
JU702 – Normally ON

#### Jumper Block – SH702

JU703 – Ultrasound Active Status  
JU704 – Overload Fault (Factory Default)  
JU705 – Over Temperature Fault  
JU706 – System Fault  
JU707 – Any Fault

Note: Please reference the circuit board diagram on the following page to locate SH701 and SH702 on the 110-3606 DPC system interface board.



Note: This diagram illustrates component locations for Revision 01 of the 110-3606 system interface board. Revision 00 of the 110-3606 system interface board offers the same configuration jumpers for pin 4. Revision 00 however does not include the SH707 jumper block which is only used for configuring DPC II / DPC II+ system inputs.

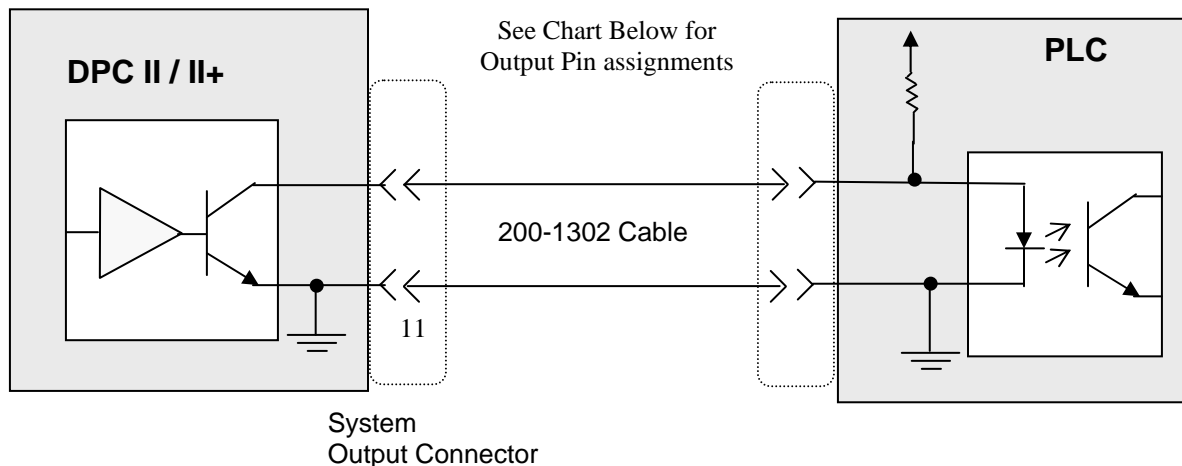
### DPC II / II+ Status Output Interface Examples:

DPC status output device ratings:

Maximum Voltage = 24 VDC

Maximum Current Rating = 1A (Pin 4 only)

100mA (All other pins in chart below)



Pin Number	Signal Description
4	Status Driver <sup>1</sup>
6	Ultrasound Active Status
7	System Fault Status
8	Over Temperature Fault Status
9	Overload Fault Status
10	On Line Status
12	Remote Amplitude Fault Status
18	MPC Ready Status
19	Power Fail Status

- Note: Status Driver output on pin 4 should be referenced to pin 3 in place of pin 11 on the diagram above.

DPC II / II+ status output configuration for use with a PLC requiring sinking inputs.

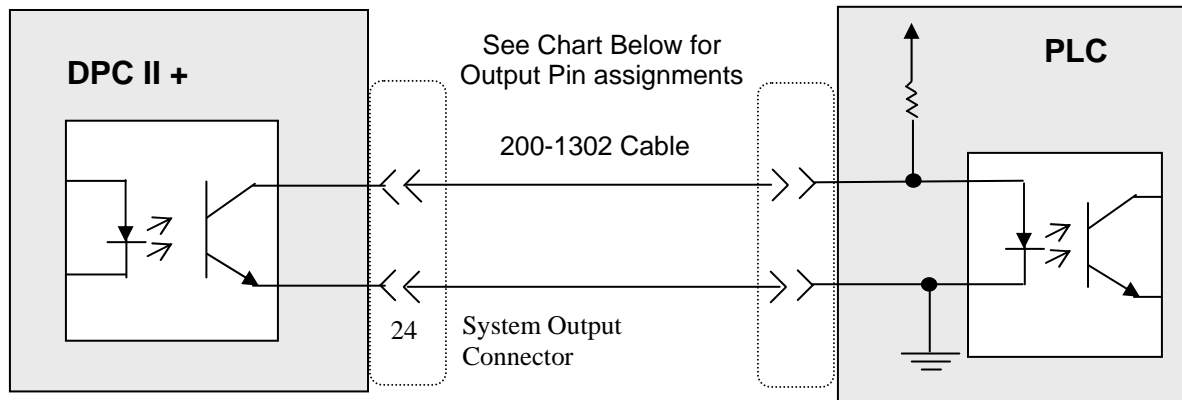
*Note: This diagram provides a simplified representation of the DPC II / II+ output device for the purpose of demonstrating circuit functionality.*

## DPC II / II+ Status Output Interface Example:

DPC status output device ratings:

Maximum Voltage = 24 VDC

Maximum Current Rating = 100Ma



Pin Number	Signal Description
20	Bad / Suspect Part Status
21	Good Part Status
22	Ready ( Cycle Ready ) Status
23	In Hold ( In Dwell ) Status

DPC II+ status output configuration for use with a PLC equipped with sinking inputs.

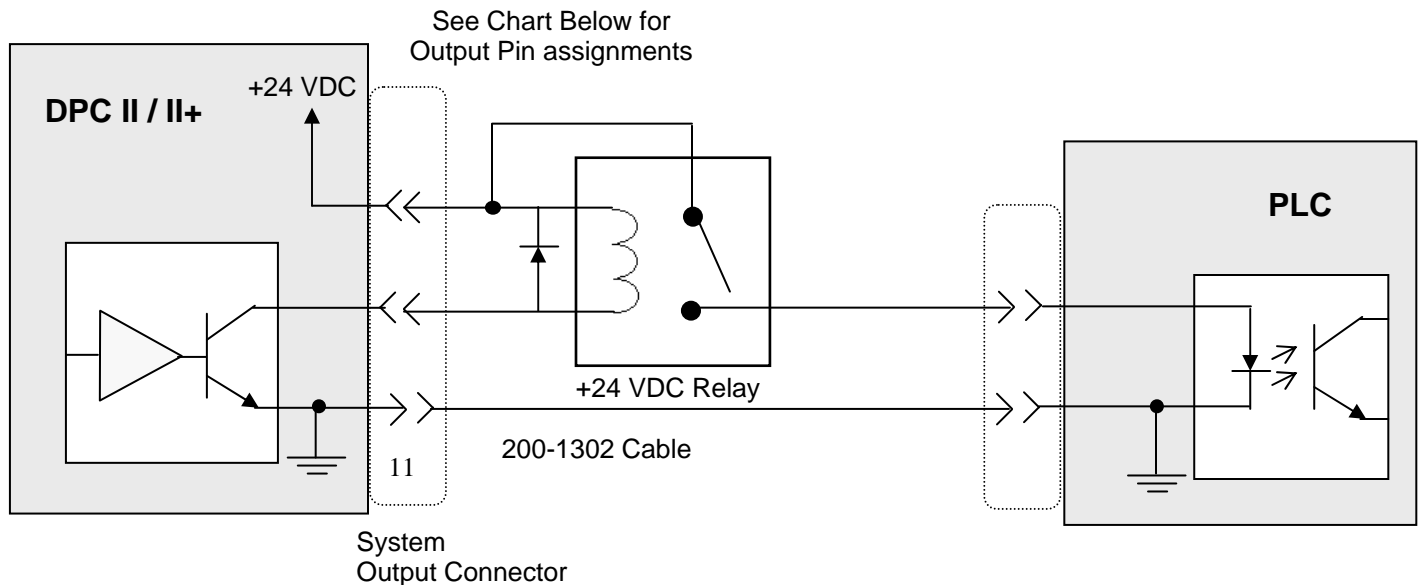
*Note: This diagram provides a simplified representation of the DPC II+ output device for the purpose of demonstrating circuit functionality.*

### DPC II / II+ Status Output Interface Examples:

DPC status output device ratings:

Maximum Voltage Rating = +24 VDC

Maximum Current Rating = 100 mA



Pin Number	Signal Description
4	Status Driver <sup>1</sup>
6	Ultrasound Active Status
7	System Fault Status
8	Over Temperature Fault Status
9	Overload Fault Status
10	On Line Status
12	Remote Amplitude Fault Status
18	MPC Ready Status
19	Power Fail Status

- Note: Status Driver output on pin 4 should be referenced to pin 3 in place of pin 11 on the diagram above.

DPC II / II+ status output configuration for use with a PLC equipped with sourcing inputs.

*Note: This diagram provides a simplified representation of the DPC II / II+ output device for the purpose of demonstrating circuit functionality.*